

# (12) UK Patent Application (19) GB (11) 2 335 947 (13) A

(43) Date of A Publication 06.10.1999

(21) Application No 9902967.0

(22) Date of Filing 11.02.1999

(30) Priority Data

(31) 19814002

(32) 28.03.1998

(33) DE

(71) Applicant(s)

**Kiekert Aktiengesellschaft**  
(Incorporated in the Federal Republic of Germany)  
Kettwiger Strasse 12-24, D-42579 Heiligenhaus,  
Federal Republic of Germany

(72) Inventor(s)

**Armin Handke**  
**Michael Scholz**

(74) Agent and/or Address for Service

**Hulse & Co**  
St James House, 8th Floor, Vicar Lane, SHEFFIELD,  
S1 2EX, United Kingdom

(51) INT CL<sup>6</sup>

**E05B 47/00 // E05B 65/20**

(52) UK CL (Edition Q )

**E2A AMXF A106 A135 A165 A191 A401 A431 A508**  
**U1S S1820 S1855**

(56) Documents Cited

**GB 2279400 A**

(58) Field of Search

UK CL (Edition Q ) **E2A AARN AMXF**  
INT CL<sup>6</sup> **E05B 47/00 65/20**

(54) Abstract Title

**Drive coupling**

(57) This invention relates to a coupling having two coupling discs (2, 3) which can turn in relation to one another, wherein one coupling disc (2) has a coupling aperture (4) and the other coupling disc (3) has a coupling pin (5) which engages in the coupling aperture (4). The coupling disc (2) with the coupling aperture (4) has a spring lip (6) which is arched towards the coupling aperture (4) and which presses the coupling pin (5) of the other coupling disc (3) against one end or the other end of the coupling aperture (4) depending on the relative position of the two coupling discs (2, 3). In this manner a tilting spring, which is otherwise necessary as a separate component, becomes unnecessary.

Fig.1

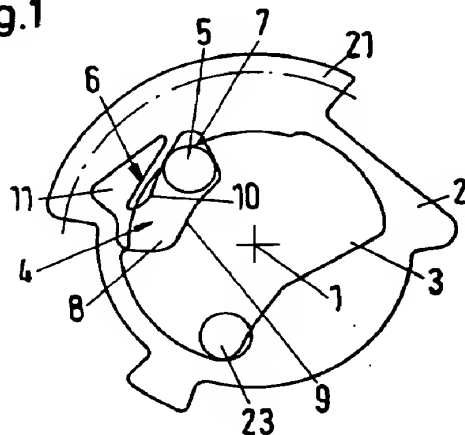
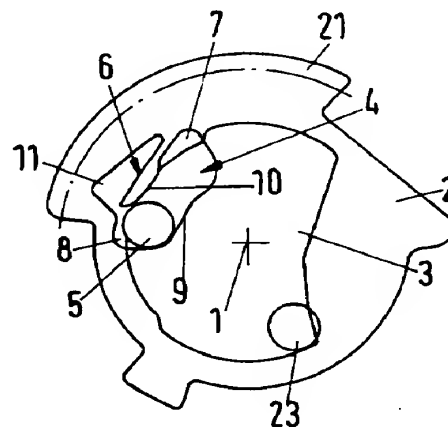


Fig.2



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Fig.1

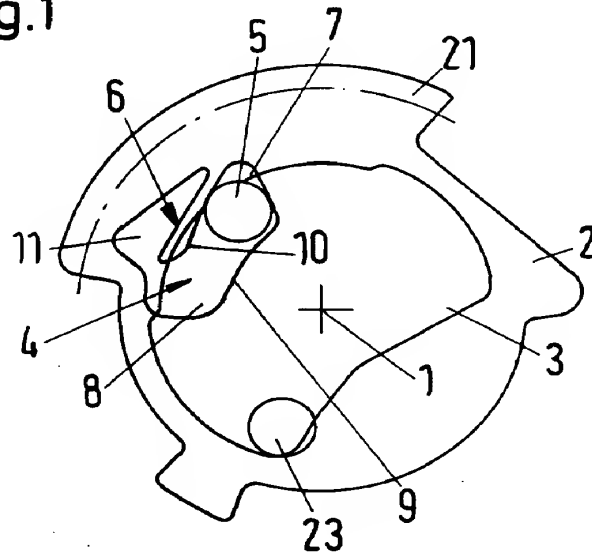
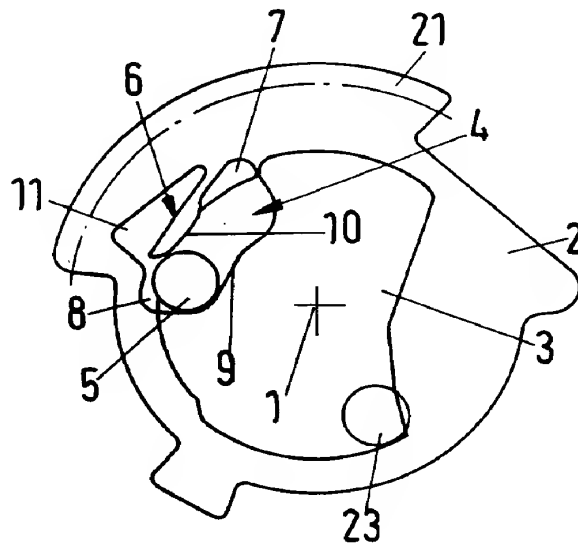


Fig.2



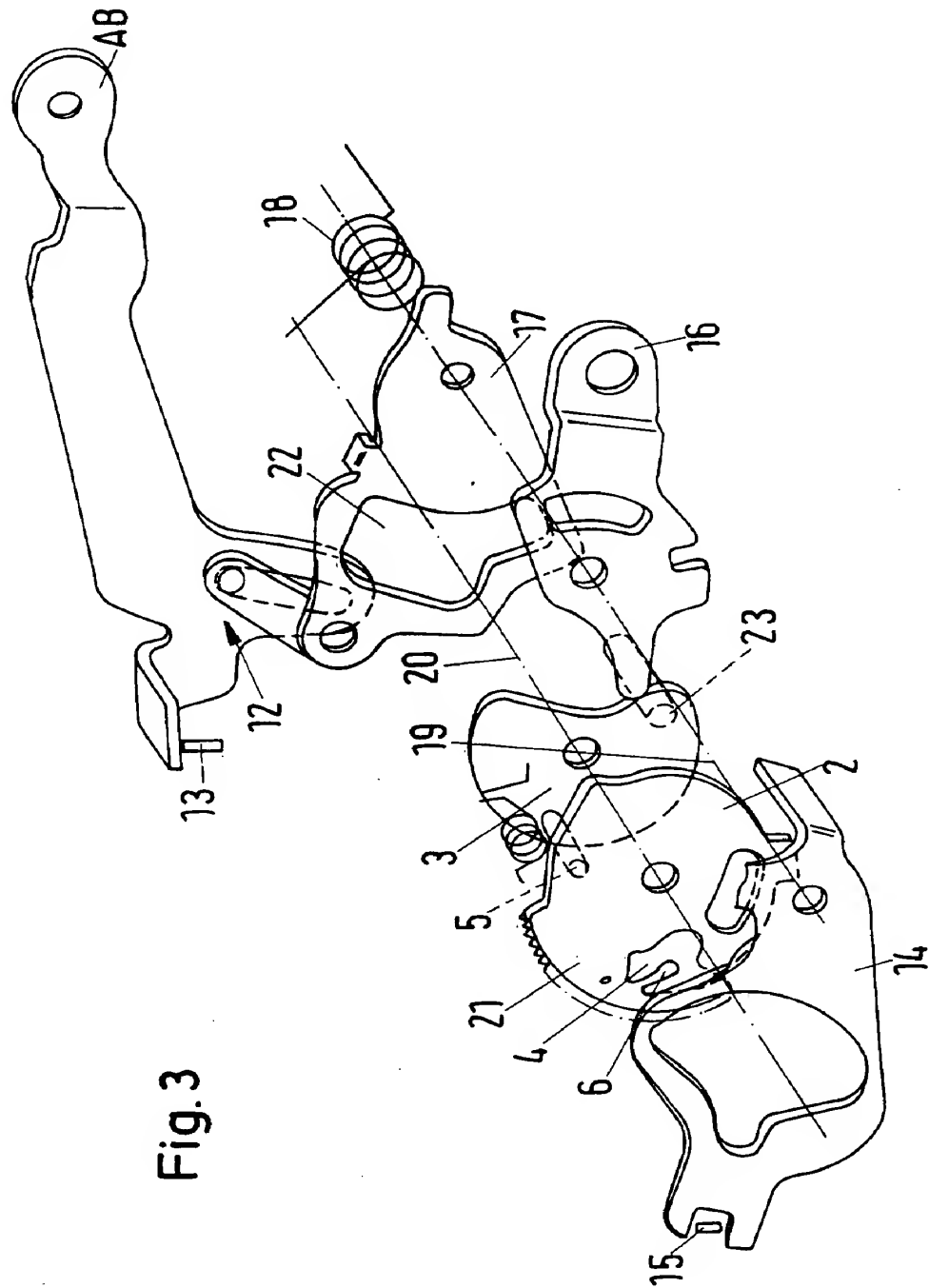


Fig. 3

"Coupling"

This invention relates to a coupling for two coupling discs which are mounted so that they can rotate in relation to each other on a common bearing axis, particularly for motor vehicle door locks.

It is known that coupling discs which are mounted so that they can rotate in relation to each other on a common bearing axis can be coupled by springs interposed therebetween. The use of tilting springs is also known in this connection when one coupling disc is to be held in relation to the other coupling disc in a defined manner in two different operating positions. The interposition of springs or tilting springs such as these firstly occupies considerable space and secondly is costly as an assembly operation. Moreover, these springs are separate components and it is necessary to anchor these components satisfactorily between each of the coupling discs which are to be coupled. The present invention aims to provide a remedy here.

A basic object of the present invention is to create a coupling of the form of construction described above which ensures a particularly simple and operationally reliable coupling between the two coupling discs, and which ensures the defined positioning thereof in at least two different operating positions after a relative movement.

According to the present invention, there is provided a coupling for two coupling discs which are mounted so that they can rotate in relation to each other on a common bearing axis, particularly for motor vehicle door locks, wherein one coupling disc has a coupling aperture which runs in the direction of rotation of the disc and the other coupling disc has a coupling pin which engages in the coupling aperture, wherein in addition the coupling disc with the coupling aperture comprises a spring lip which is arched towards the coupling aperture and which presses the coupling pin of the other coupling disc against one end or the other end of the coupling aperture depending on the relative position of the two coupling discs.

The consequence of these measures according to the invention is that a spring or tilting spring, which is otherwise customary between the two coupling discs, can be dispensed with as a separate

component. Instead, this spring is replaced by a spring lip which is integrated in the coupling disc which comprises the coupling aperture. In this respect, a one-piece, space-saving mode of construction which is simple to assemble is put into effect and is distinguished by its operational reliability

Other features which form part of the essence of the invention are listed below. Thus the invention provides for the coupling aperture to have bearing recesses for the coupling pin at its ends, in order to ensure the defined positioning, under spring pressure, of the coupling pin in its two end positions. The bearing recesses are constructed here so that during the movement of the two coupling discs in relation to each other only a relatively low resistance has to be overcome in addition to the spring force in order to move the coupling pin from one bearing recess into the other bearing recess. In this connection, at least one flank of the coupling aperture, which flank is opposite the spring lip, advantageously extends arcuately between the two bearing recesses in the direction of rotation of the disc. According to the invention, the spring lip has an arched portion which is situated in the middle of its spring and which is arched towards the coupling aperture. The coupling pin has to be guided past this arched portion when it is moved from one bearing recess into the other bearing. This arched portion forms the vertex point, as it were, between one bearing recess and the other bearing recess, and consequently forms the vertex point between the coupling pin being spring loaded towards one bearing recess or the other bearing recess. A pocket, which temporarily accommodates the spring lip which can be pushed back by the coupling pin just when the coupling pin is moved from one bearing recess into the other bearing recess, is preferably situated on the side of the spring lip facing away from the coupling aperture. The spring lip thus forms a peninsular-like projection between the coupling aperture and the pocket. This is because the spring lip forms a flank of the coupling aperture which is opposite the arcuate flank and is constructed as a projection which has a free spring lip end and which starts from one end of the coupling aperture.

According to one particular embodiment, one coupling disc is constructed as a theft protection power take-off element and the other coupling disc is constructed as a theft protection disc in the locking system of a motor vehicle door lock. The two coupling discs may consist of steel or

plastics, wherein in the latter case the coupling disc with the spring lip is then made of a plastics material which exhibits satisfactory flexural resilience.

The invention is explained in greater detail below with reference to the drawings, which merely illustrate an example of an embodiment, and where:

**Figure 1** is a plan view of a coupling according to the invention;

**Figure 2** shows the subject of Figure 1 in a different operating position; and

**Figure 3** is a perspective illustration showing a portion of the locking system of a motor vehicle door lock which comprises the coupling according to the invention.

The Figures illustrate a coupling for two coupling discs 2, 3 which are mounted so that they can rotate or swivel in relation to each other on a common bearing axis 1. One coupling disc 2 has a coupling aperture 4 which runs in the direction of rotation of the disc and the other coupling disc 3 has a coupling pin 5 which engages in said coupling aperture 4. The coupling disc 2 with the coupling aperture 4 comprises a spring lip 6 which is arched towards the coupling aperture 4 and which presses the coupling pin 5 of the other coupling disc 3 against one end or the other end of the coupling aperture 4 depending on the relative position of the two coupling discs 2, 3. The coupling aperture 4 has bearing recesses 7, 8 for the coupling pin 5 at its ends. One flank 9 of the coupling aperture 4, which flank is opposite the spring lip 6, extends arcuately between the two bearing recesses 7, 8 in the direction of rotation of the disc. The spring lip 6 has an arched portion 10 which is situated in the middle of its spring and which is arched towards the coupling aperture 4. However, the spring lip 6 can also be constructed in the manner of a roof ridge which points towards the coupling aperture 4, whereupon the roof ridge, like the arched portion 10, forms a vertex point for the spring-loading of the coupling pin 5 on its path towards one bearing recess 7 and towards the other bearing recess 8. A pocket 11 for the spring lip 6, which spring lip can be pushed back by the coupling pin 5, is situated on the side of the spring lip 6 facing away from the coupling aperture 4. This pocket becomes effective in particular during the movement of the coupling pin over the arched portion 10. The spring lip 6 forms a flank of the coupling

aperture 4 which is opposite the arcuate flank 9, and is constructed as a projection which has a free spring lip end and which starts from one end of the coupling aperture 4.

Figure 3 illustrates a portion of a motor vehicle door lock. This door lock has an operating lever system which acts on a release element 12 and which comprises an interior operating lever 13 and an exterior operating lever AB. In addition, the door lock has a locking lever system which comprises a central locking lever 14 which is actively connected to an interior locking lever 15 and an exterior locking lever 16. In the "locked" direction of operation, the central locking lever 14 and a coupling lever 17 which connects the operating lever system to the locking lever system are positively connected to each other, and in the "unlocked" direction of operation they are nonpositively connected to each other via a pull-back spring 18. The central locking lever 14, the exterior locking lever 16 and the coupling lever 17 are swivel-mounted on a common bearing axis 19. Amongst other components, a coupling disc which is constructed as a theft protection power take-off element 2 and a coupling disc constructed as a theft protection disc 3 are situated, both rotatably mounted, on an axis of rotation 20 which is parallel to said bearing axis 19. In the embodiment exemplified, the theft protection power take-off element 2 comprises a toothed segment 21 and comprises the coupling aperture 4 which runs in the direction of rotation of the theft protection disc 3, whilst the theft protection disc 3 has the coupling pin 5 which engages in the coupling aperture 4 of the theft protection power take-off element 2 and has a theft protection pin 23 which engages in a theft protection aperture 22 of the coupling lever 17. It is also possible, however, for the coupling aperture 4 to be situated in the theft protection disc 3 and for the coupling pin 5 to be situated on the theft protection power take-off element 2. An electric motoroperated, reversible theft protection drive, which is not shown, acts on the toothed segment 21 of the theft protection power take-off element 2. The central locking lever 14, the theft protection power take-off element 2, the theft protection disc 3, the exterior locking lever 16 and the coupling lever 17 are disposed or arranged in layers one above another.

The theft protection power take-off element 2 and the theft protection disc 3 are connected to each other via the resilient spring lip 6 which is integrally formed on the theft protection power take-off element 2 which comprises the coupling aperture 4 and is produced as a plastics part. The coupling pin 5 is pressed by the middle arched portion 10 of the spring lip 6 against one or the

other end of the coupling aperture 4. Figure 1 illustrates the normal situation, whilst Figure 2 shows the situation after emergency unlocking has been effected via the exterior locking lever 16. One advantage of this design is that the requisite forces are different. Since a greater force can be applied when emergency unlocking is effected via the exterior locking lever 16 and thus via the key, the projection of the spring lip 6 is situated in the vicinity of that end of the coupling aperture 4 against which the coupling pin 5 is pressed in normal operation. The theft protection disc 3, and thus the coupling pin 5, remain in the "emergency unlocked" operating position, as does the theft protection power take-off element 2, until the theft protection drive is in operation again, after the battery has been replaced for example. After emergency unlocking has been effected, the theft protection disc 3 is situated in the "theft protection off" operating position (is turned anticlockwise) and the theft protection power take-off element 2 is situated in the "theft protection on" operating position. To effect synchronisation, the theft protection power take-off element 2 is rotated clockwise by an electric motor. In the course of this procedure, the theft protection disc 3 is held against a stop, which is not illustrated, so that during this rotation the spring lip 6 is pushed back and its arched portion 10 by-passes the coupling pin 5. The force required for synchronisation is thus less than the force required for emergency unlocking, since the coupling pin 5 is at a distance from the projection on the spring lip 6 and thus has a longer lever arm.



## Claims

1. A coupling for two coupling discs which are mounted so that they can rotate in relation to each other on a common bearing axis, particularly for motor vehicle door locks,

wherein one coupling disc has a coupling aperture which runs in the direction of rotation of the disc and the other coupling disc has a coupling pin which engages in the coupling aperture,

wherein in addition the coupling disc with the coupling aperture comprises a spring lip which is arched towards the coupling aperture and which presses the coupling pin of the other coupling disc against one end or the other end of the coupling aperture depending on the relative position of the two coupling discs.

2. A coupling according to claim 1, wherein the coupling aperture has bearing recesses for the coupling pin at its ends.

3. A coupling according to claims 1 or 2, wherein at least one flank of the coupling aperture, which flank is opposite the spring lip, extends arcuately between the two bearing recesses in the direction of rotation of the disc.

4. A coupling according to any one of claims 1 to 3, wherein the spring lip has an arched portion which is situated in the middle of its spring and which is arched towards the coupling aperture.

5. A coupling according to any one of claims 1 to 4, wherein a pocket for the spring lip, which spring lip can be pushed back by the coupling pin, is situated on the side of the spring lip facing away from the coupling aperture.

6. A coupling according to any one of claims 1 to 5, wherein the spring lip forms a flank of the coupling aperture which is opposite the arcuate flank, and is

constructed as a projection which has a free spring lip end and which starts from one end of the coupling aperture.

7. A coupling according to any one of claims 1 to 6, wherein one coupling disc is constructed as a theft protection power take-off element and the other coupling disc is constructed as a theft protection disc in the locking system of a motor vehicle door lock.

8. A coupling substantially as herein before described with reference to the accompanying drawing(s).



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Application No: GB 9902967.0  
Claims searched: 1-7

Examiner: Philip Silvie  
Date of search: 25 May 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): E2A (AARN, AMXF)

Int Cl (Ed.6): E05B (47/00, 65/20)

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2 279 400 A (MITSUI) see figs. 4,6	1-3,6,7 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.